THE LUNAR MAPPING AND MODELING PROJECT. S. K. Noble[1,2], R. A. French[1], M. E. Nall[1], and K. G. Muery[1], [1]NASA Marshall Space Flight Center, Huntsville AL 35805, sarah.k.noble@nasa.gov, [2]University of Alabama Huntsville, Huntsville AL 35805.

Introduction: The Lunar Mapping and Modeling Project (LMMP) has been created to manage the development of a suite of lunar mapping and modeling products that support the Constellation Program (CxP) and other lunar exploration activities, including the planning, design, development, test and operations associated with lunar sortie missions, crewed and robotic operations on the surface, and the establishment of a lunar outpost. The information provided through LMMP will assist CxP in: planning tasks in the areas of landing site evaluation and selection, design and placement of landers and other stationary assets, design of rovers and other mobile assets, developing terrain-relative navigation (TRN) capabilities, and assessment and planning of science traverses.

Project Scope and Purpose: LMMP will provide access to this data through a single intuitive and easy to use NASA portal that transparently accesses appropriately sanctioned portions of the widely dispersed and distributed collections of lunar data, products and tools. Two visualization systems are being developed, a web-based system called Lunar Mapper, and a desktop client, ILIADS, which will be downloadable from the LMMP portal.

We are working closely with the LRO team to prevent duplication of efforts and to ensure the highest quality data products. While Constellation is our primary customer, LMMP is striving to be as useful as possible to the lunar science community, the lunar commercial community, the lunar education and public outreach (E/PO) community, and anyone else interested in accessing or utilizing lunar data.

Data Sources: The LMMP will focus predominately on data products resulting from the Lunar Reconnaissance Orbiter (LRO) and Lunar CRater Observation and Sensing Satellite (LCROSS) missions, but will also utilize historical lunar data (e.g., Apollo, Lunar Orbiter, Clementine, Lunar Prospector) and international lunar mission data (e.g., Kaguya, Chandrayaan-1, SMART-1), as available and appropriate, to meet specific near-term product, product type and/or product resolution and accuracy needs.

Data products: LMMP will produce products on a global, regional, and local scale. Local products will be focused on the Constellation program's 50 sites of interest [1]. LMMP will incorporate three different types of products. "Pass-through" products are those which LMMP will ingest and display "as is" from PDS or other sources. Examples of pass though products include the LOLA topography and Clementine and Prospector derived products. In some cases we will modify the data given to us. Examples of modifications include mosaicking the LROC WAC basemap and georeferencing local images. There are also some products that LMMP is producing. Examples of LMMP products include regional and local DEMs from Apollo and LROC NAC imagery, maps of slope and surface roughness, and maps of crater and boulder distributions.

LMMP team members and roles: The project draws on expertise from several NASA and non-NASA organizations (MSFC, ARC, GSFC, JPL, ASU, CRREL – US Army Cold Regions Research and Engineering Laboratory, and the USGS).

The team is well integrated but the major responsibilities are divided as follows:

- MSFC – Management and overall coordination
- Ames - Regional Apollo visible base imagery mosaics and DEMs, EPO web-based neogeography interfaces
- USGS - Local/site visible base imagery mosaics, regional/polar visible base imagery mosaics, local/site DEMs
- JPL - Visualization system infrastructure, web portal and interoperable GIS infrastructure, local/site DEMs (stereo photoclinometry), local/site albedo maps, resource maps, hazard assessment maps
- AZ State U – Local/site DEMs
- CRREL - Web-based visualization system digital overlay tools (Lunar Mapper)
- GSFC - Desktop visualization client – Integrated Lunar Information Architecture for Decision Support (ILIADS)

Schedule: The LMMP project passed formulation review in April of 2009 and a level 3 requirements review in June. Following a series of individual product process validation audits and a preliminary system design audit, a beta version of the portal and visualization systems is expected to be released in late 2009. A version 1 release is planned for early 2011. Our schedule for the release of data products is, however, highly dependent on the timing of acquisition of data from LRO.

References: [1] Noble S. K. et al. (2009) The 50 Constellation Priority Sites. Abstracts to the 2009 Lunar Science Forum, Mountain View CA.